Pramana – journal of physics

Volume 48
1996

Published by
Indian Academy of Sciences
Bangalore 560 080

Pramana – journal of physics

Editor

R Nityananda
Raman Research Institute, Bangalore

Associate Editor

H R Krishnamurthy
Indian Institute of Science, Bangalore

Editorial Board

G S Agarwal, *Physical Research Laboratory, Ahmedabad*
V Balakrishnan, *Indian Institute of Technology, Madras*
J K Bhattacharjee, *Indian Assoc. for the Cultivation of Science, Calcutta*
D N Bose, *Indian Institute of Technology, Kharagpur*
B M Deb, *Panjab University, Chandigarh*
Rohini M Godbole, *Indian Institute of Science, Bangalore*
S Kailas, *Bhabha Atomic Research Centre, Bombay*
R K Kaul, *The Institute of Mathematical Sciences, Madras*
A V Khare, *Institute of Physics, Bhubaneswar*
T Padmanabhan, *Inter-Univ. Centre for Astronomy and Astrophysics, Pune*
R Ramaswamy, *Jawaharlal Nehru University, New Delhi*
A K Raychaudhuri, *Indian Institute of Science, Bangalore*
K C Rustagi, *Centre for Advanced Technology, Indore*
E V Sampathkumaran, *Tata Institute of Fundamental Research, Bombay*
Abhijit Sen, *Institute for Plasma Research, Gandhinagar*
S K Sikka, *Bhabha Atomic Research Centre, Bombay*
Y Singh, *Banaras Hindu University, Varanasi*

Editor of Publications of the Academy

V K Gaur
C-MMACS, NAL, Bangalore

Annual Subscription Rates

All countries except India (Price includes AIR MAIL charges)	US$ 200
India	Rs. 200

Annual subscriptions for **individuals** for India and abroad are Rs. 100/- and $50 respectively.

All correspondence regarding subscription should be addressed to the **Circulation Department** of the Academy

---

Editorial Office

Indian Academy of Sciences, C V Raman Avenue,
P.B. No. 8005, Bangalore 560 080, India

Telephone: 334 2546
Telex: 845-2178 ACAD IN
Telefax: 91-80-334 6094

Email: pramana@ias.ernet.in

© 1997 by the Indian Academy of Sciences. All rights reserved.

"Information for contributors" is printed in the last issue of every volume.

Pramana – journal of physics

CONTENTS – VOLUME 48

(January – June 1997)

Numbers 1 and 2

Special Issue on Nonlinearity and Chaos in the Physical Sciences – Parts I and II

Editors' note 1

Preface 3

Mathematical aspects of dynamical systems

Random matrices and matrix models: The JNU lectures ..*Madan Lal Mehta* 7

Hölder exponents of irregular signals and local fractional derivatives .....
.....*Kiran M Kolwankar and Anil D Gangal* 49

Signature of chaos in power spectrum .....
.....*M C Valsakumar, S V M Satyanarayana and V Sridhar* 69

Dynamics of simple one-dimensional maps under perturbation .....
.....*Somdatta Sinha and Parichay K Das* 87

Chaos in modulated logistic systems .....*V M Nandakumaran* 99

Effect of boundary conditions on the invariant density of noisy maps at fully-developed chaos .....*V Balakrishnan, G Nicolis and C Nicolis* 109

Symplectic integration of nonlinear Hamiltonian systems .....
.....*Govindan Rangarajan* 129

Integrable systems and solitons

Painlevé analysis and integrability aspects of some nonlinear partial differential equations .....*K Porsezian* 143

Localized coherent structures of $(2 + 1)$ dimensional generalizations of soliton systems .....*M Lakshmanan and R Radha* 163

Geometry and nonlinear evolution equations .....*Radha Balakrishnan* 189

Nonlinear chiral models: Soliton solutions and spatio-temporal chaos .....
.....*M S Sriram and J Segar* 205

Spatio-temporal chaos, synchronization and control

Control methods for problems of mixing and coherence in chaotic maps and flows .....*Ashutosh Sharma and Neelima Gupte* 231

5 629HI XL 12/97 31249-200 NJLE 1386

Rapid Communication

Helium atom in intense and superintense laser fields: A new theoretical approach.....*Bijoy Kr Dey and B M Deb* 849

Number 4

Surface harmonics for pentagonal point groups.....*K Rama Mohana Rao, P Hemagiri Rao and V Satyavathi* 859

Characterization of chaos in a serrated plastic flow model.....*S V M Satyanarayana, V Sridhar and S Koka* 871

Structural phase transition in substituted La_2CuO_4 and Pr_2CuO_{4-y}.....*Meena Chaudhri, Kunal B Modi, K M Jadhav and G K Bichile* 883

A stochastic model for solidification II. Application to binary metallic melts.....*Shobha Dass, Gautam Johri and Lakshman Pandey* 891

Superconducting state parameters of metallic glass $Mg_{70}Zn_{30}$ using linearized screened pseudopotential.....*Manish Gupta, K S Sharma and L Dass* 923

Electron paramagnetic resonance studies of photorefractive crystals II: Fe^{3+} doped $Bi_{12}SiO_{20}$ with copper vapour laser illumination in 10–100 K range.....*N K Porwal, R M Kadam, Y Babu, M D Sastry, M D Aggarwal and Putcha Venkateswarlu* 929

Resonance de-enhancement in the $2^1 A_g$ state of *trans*-azobenzene.....*Nandita Biswas and Siva Umapathy* 937

Brief Report

Kramers–Kronig analysis of the reflectance spectra of Pb-doped Bi-4334 type glass and the corresponding glass-ceramic super-conductor.....*Souri Banerjee, S Chatterjee and B K Chaudhuri* 951

Number 5

The geometric phase and ray space isometries.....*Joseph Samuel* 959

Thomas rotation and polarized light: A non-abelian geometric phase in optics.....*Joseph Samuel and Supurna Sinha* 969

On periodically kicked quantum systems.....*N D Sen Gupta* 977

Weak decay constants of light and heavy pseudoscalar mesons.....*N Barik, S Kar and P C Dash* 985

Meson spectroscopy with confined one gluon exchange potential.....*K B Vijaya Kumar, A K Rath and S B Khadkikar* 997

Two body non-leptonic decays $B \to D\pi$ with heavy quark and chiral symmetry.....*A K Giri, L Maharana and R Mohanta* 1005

Solution of approximate gluon evolution equation for small-x at fixed 'ρ'.... ....*A Saikia* 1015

Heavy-ion scattering at low energies: First-order correction to the eikonal phase shift....*S K Charagi* 1021

Semi-empirical formulae for Λ-binding energy in hypernuclei using mass distribution....*M Z Rahman Khan, Nasra Neelofer and M A Suhail* 1027

Group theoretical aspects of $U^B(6) \otimes U^F(20)$ symmetry limits of IBFM related to the $U^B(5)$ and $O^B(6)$ limits of IBM....*V K B Kota* 1035

Photon interaction cross-sections and anomalous scattering factors of Cu and Ag....*Sandiago, T K Umesh and Ramakrishna Gowda* 1077

Number 6

Probability distribution of normalized structure factor magnitudes for a centrosymmetric crystal with planar molecules in the unit cell.... ....*Sabita Das and G B Mitra* 1091

Activation energy of hydrogen in Lu....*N Singh and B Kumar* 1095

Electron momentum density distribution in iridium by Compton scattering technique....*K B Joshi, R K Pandya, B L Ahuja and B K Sharma* 1105

Magnetic behaviour of TbMnFe....*Keka Chakraborty, S K Paranjpe, V Siruguri, O D Jayakumar and S K Kulshreshtha* 1115

Spin state and exchange in the quasi-one-dimensional anti-ferromagnet $KFeS_2$....*Satish Kumar Tiwary and Sukumaran Vasudevan* 1123

Field emission theory of dislocation-sensitized photo-stimulated exo-electron emission from coloured alkali halide crystals.... ....*B P Chandra, R S Chandok and P K Khare* 1135

Thermal quenching of luminescence in erbium doped semiconductors.... ....*B Chanda and D N Bose* 1145

Spectroscopic properties of Er^{3+} ions in cadmium and alkali cadmium borosulphate glasses....*C K Jayasankar and V V Ravi Kanth Kumar* 1151

Collisional excitation among the seven lowest states of TiXII.... ....*M Mohan and A Hibbert* 1161

Brief Report

Compton profiles of electron momentum distribution in β-Ga.... ....*B K Acharya and N C Mohapatra* 1169